



PM TRADE

Interface Standards Working Group Industry Day

Rob Wolf

PM TRADE
Strategic Requirements Integrator
2 April 2013

PM TRADE Mission Area Functional Domains

Communicating Across the Boundaries - One PM TRADE Portfolio



Exercise Control
& Communications
Networks

O/Cs

Field TOC

CTC ExCon /
Range Ops
Ctr /
Homestation

Force-On-Force

Force-On-Target

Targets

Urban
Operatio
ns

Battlefiel
d Effects

ExCon & Comms

ExCon, AAR, RF Comms. ABCS,
& Network Data Management

T-IS

Simulated Fire

Combined Arms Engagement Pairing
BLUFOR & OPFOR

PM LTS

A-TESS

Live Fire

Instrumented Urban Operations,
& Battlefield Effects

PM DT

FASIT

Standards Management (CTIA, LT2, FASIT) - APM TRADE

Interface Standards Industry Day Agenda



0900-0910
- Opening Remarks
- Introduction

0910-0930
- Interface Standards Discussion

0930-1130
  - ✓ **Connector / RS-232 / Power** > *IPT Lead Paul Smith*
  - ✓ **General Purpose I/O** > *IPT Lead Hung Nguyen*
  - ✓ **USB** > *IPT Lead Jim Grosse*
  - ✓ **PAN** > *IPT Lead Jesse Campos*
  - ✓ **Common Message Format** > *IPT Lead Paul Smith*
  - ✓ **Battery ICD and Configurations** > *IPT Lead Dave Brunat*
  - ✓ **Family of Consumable Batteries** > *IPT Lead Dave Brunat*
- Development Process
- IPT Govt/Industry Breakout Sessions

1130-1200
- Individual IPT Introductions, Summary, & IPT 1st Meeting Date/Location

Lunch

1300-1400
- PM TRADE Standards Update
  - ✓ **LTEC** – *Jim Grosse*
  - ✓ **Aviation** – *Jim Grosse*

1400-1500
  - ✓ **Victory** - *Pat Sincebaugh*
  - ✓ **A-TESS** – *Dave Brunat*
- Closing Remarks/Next Meeting – Open Discussion/Feedback

Introduction – Welcome & Thank You



The Journey - ***Our window of opportunity starts now.***

- ✓ **It's a new beginning - Its your opportunity to define our future.**
- ✓ **Each IPT will shape the standard implementation, interfaces, and protocols.**
- ✓ **Each IPT has varying complexity issues and durations (2-14 Months).**
- ✓ **Collaborative Working Group - Non biased problem solving environment.**
- ✓ **If you sign up for an IPT – Stay with the IPT for the duration – Continuity.**
- ✓ **We are a Team – We are on this journey together.**

The Product - ***Interface specifications for future RFPs.***

- ✓ **No Proprietary Interface Standards, supporting SW, or messaging.**
- ✓ **As good as we think our products are, there will be errors. Each**

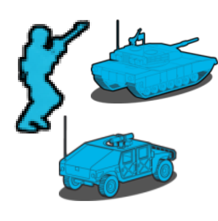
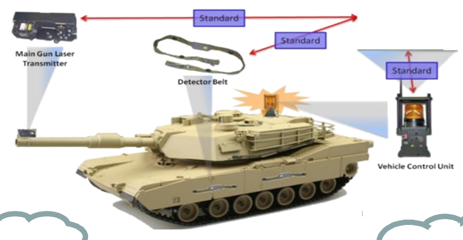
Legal & Contracts Slide





- **No funding for WG – Voluntary effort**
- **No standards acquisition program**

PM TRADE TESS Evolution / Vision Slide

	MILES TESS Configurations	Key Interfaces	Communications (Instrumentation Radio)
Circa 1980-2002	 Vendor Specific Closed Systems	MILES Code Standard	Non Instrumented Initially then Custom Radio Interfaces
2002 -2012	 Vendor Specific Closed Systems With Custom Radio Interfaces	✓ MILES Code upgrades ✓ TESS Radio Interface ✓ PAN in Development	✓ Radio TESS Interface Standards – Compilation ✓ LT2 Gateway
Near Term Vision (2013-2020)	Component Based Acquisitions Open Published Interfaces and Perf. Stds.  **TESS SW** **Software Based TESS systems** **BDA SW**	✓ Supported Standards • RS-232 • 802.15.4 (PAN) • USB ✓ Common Message Format ✓ Connections & Interfaces ✓ Power Interface ✓ LTEC SW (TESS/BDA)	✓ Published Interfaces ✓ Common Message Set ✓ LTEC TESS Logic & RTCA/BDA SW ✓ Remote CM Services from IDE. ✓ *Tactical Radios/Systems Supporting some Training capabilities*
Long Term Vision	Training functionality Embedded as part of tactical weapon/radios. -- Individual Soldier and Weapon System computer/displays/optics...	Developing & Managing Training Software Applications and Weapon/Radio/Soldier Computer Interfaces/firewalls to Push and Pull data driving Stimulations *(effects, graphics, audio, simulated C4ISR communications, real time coaching...)*	

Near Term Objectives



1. **Identify Critical Standards & Interfaces**
   - ✓ Fight the close fight first (CTC-IS under contract – PDR Tomorrow)
     - *Leverage existing work, improve structure, and add growth capability*
   - ✓ Mature interface details and associations over the next year for TVS

2. **PM TRADE Developing and Publishing an Internal Process**
   - ✓ Implement an internal standards process with stakeholder governing IPT
   - ✓ Establish a portfolio of standards – eliminate reactionary implementation

3. **Greater Industry Participation in Standards Development Process**
   - ✓ Leverage existing CPM process with Industry participation
   - ✓ Refocus activity on critical IPT identified standards

4. **Create a Tier 2 and Tier 3 Standards Road Map list for future development**
   - ✓ Develop as time permits or a new program changes urgency
   - ✓ Govt. IPT determines active standards/ICD development initiatives

Portfolio Road Map Starting Reference



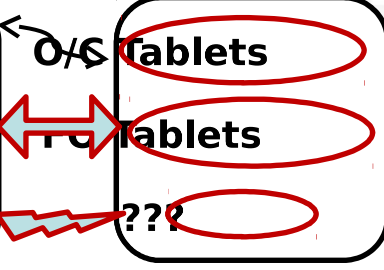
CTIS/DT ExCon

Interfaces with Training Exercise Area via Gateway >>> Migrate to Common Message Format.

Common Message Structure independent of carrier or radio

CTIS/DT Network Radios

Communicate with LTS family of products and other devices via the PAN or published wired interface.

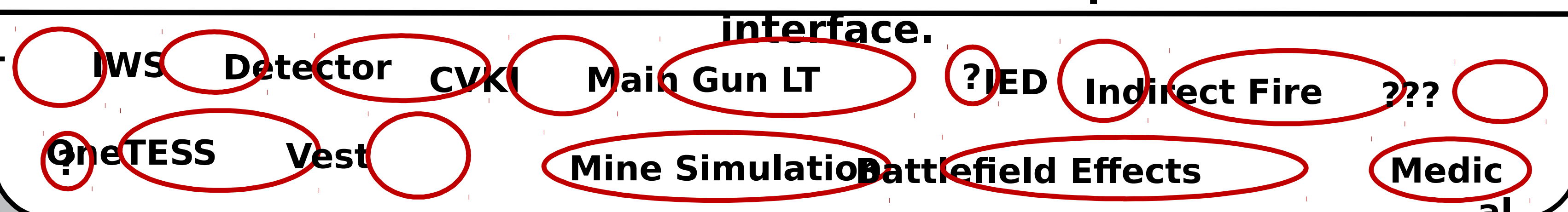


802.15.4 PAN

Wired interface supporting RS-232 and USB

PM TRADE Family of Systems and Components

Communicate with one another via PAN or published wired interface.



Radio / Component Interface Standards



Radio

ExCon Side

Component Side

ExCon Side - Gateway

Migrate to Common Message Format

RS-232

802.15.4

USB

Power

Communication Standard / Use

IS-TESS Standard (Legacy), General Messaging

Wireless PAN, Primary TESS Component Interface

Multi Use High Speed messaging (Direct interface or convert to BT, Ethernet...)

Power ICD (minimizes component dependencies)

Interface to Live Components via:

1. **RS-232**
2. **USB**
3. **PAN**



Interface Standards Discussion

Interface Standards Discussion



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Connector / RS-232 / Power

IPT Lead Paul Smith



- **Identify common radio interface standard and connector to support power, RS-232, GP I/O and USB.**
- **Interface Standard would support CTC-IS, AMITS, and future radios.**

IPT Goal

1. **Identify the connector and pin out for CTC-IS and AMITS.**
2. **Update IS-TESS interface standard.**

Connector / RS-232 / Power

IPT Lead Paul Smith



Single Input / Output / Power Connector

- ✓ RS-232 Port – 5 pins
- ✓ USB 2.0 Host port – 3 pins
- ✓ 3 GPIO signals - 3 pins
- ✓ Power with SMBus – 5 pins
- ✓ TESS Power – 4 pins

Instrumented Player Unit / Radio

GPS ANTENNA CONNECTOR

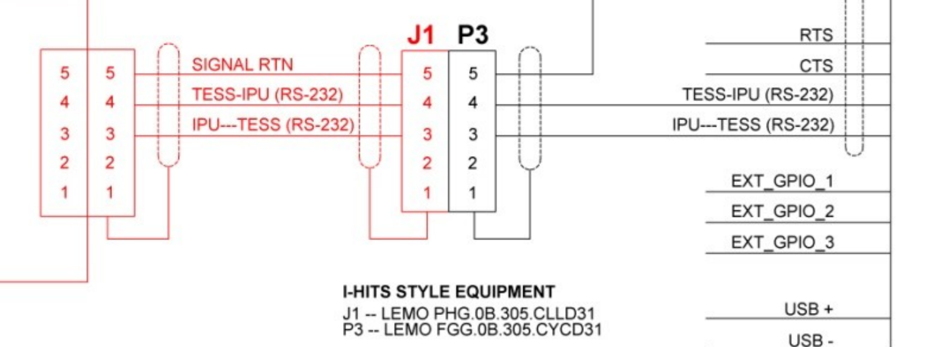
LTE ANTENNA CONNECTOR

19 pin 22 AWG contacts

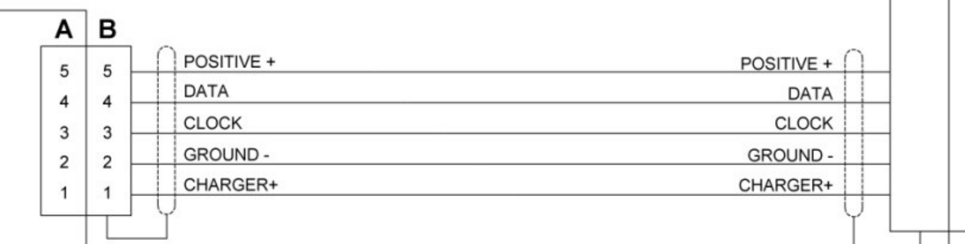
Small diameter
Push/Pull connection

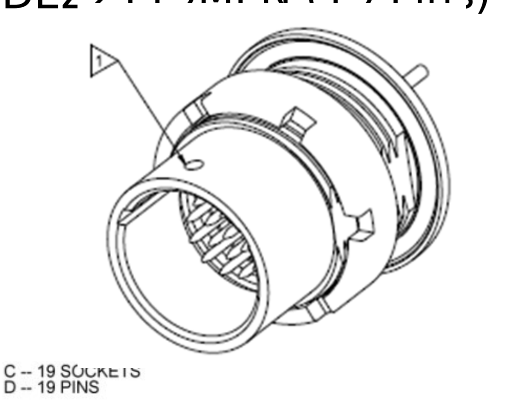
CTC-IS leading candidate
Souriau P/N
JDEZ2T19MPN (19 Pins)

Dismount TESS



Battery





General Purpose I/O

IPT Lead Hung Nguyen



- **Discrete I/O supports Legacy Targets (CIC-RE) interface.**
- **CTC-IS implementation uses additional I/O pins to identify legacy MILES devices looking for unique identifiers.**

IPT Goal

1. **Address potential alternate methods to identify legacy MILES devices.**
2. **Document potential future use cases, applications, and development/implementation guidance for future programs.**

Radio identification of connected TESS



Seeking Industry lessons learned or Ideas.

1. **Possible ways to 'auto-detect' software decision tree to uniquely identify the TESS variant connected to the RS-232 serial port?**

2. **Cable Identification – using a combination of 3 GPIO pins to uniquely identify the connected TESS variant (current solution at CTCs)?**

- **Groups based on compatibility of ICDs**
  - ✓Group 1: MILES XXI, IWSv1
  - ✓Group 2: MILES ITS, MILES WITS, TVS?, CVTESS?
  - ✓Group 3: MILES 2000
  - ✓Group 4: MILES II/RVDD

USB

IPT Lead Jim Grosse



Vision – Bus provides a means to introduce new systems and commercial products to the training environment.

- Evolve to become primary future component interface.
- Use cases consider power tradeoff (RS-232 vs USB).

1. IPT has clean slate to adopt and shape USB implementation and supporting applications / development guidance.

2. Implementation supports both Maintenance and Operations

USB Discussion Points



ON Comments

- ✓ There are several different standards within USB (ex. 2.0, host, device, OTG, HS, FS) and several different profiles within each standard.
- ✓ Not all USBs are created equal. Standardizing on USB would require considerable effort in defining a particular implementation each time the USB connection is used (ex. 2.0 HS host using serial port profile).
- ✓ Changing from host to device will require hardware and software changes.
- ✓ High speed wired interface should be accomplished via Ethernet.
- ✓ Future vehicle platforms appear to have Ethernet and USB.
- ✓ Ethernet is lower complexity to integrate.

Wireless PAN 802.15.4 (2.4 GHz)



IPT Lead Jesse Campos

- **Live PAN Interface Standard PRF-PT-00549 conforms to 802.15.4 physical layers.**
- **MAC layer settings tailored to meet the live training use cases.**
- **PRF-PT-00549 has never been fielded.**

IPT Goal **Mature and validate PRF-PT-00549**

- ✓ **Leverage existing Live PAN Interface Standard PRF-PT-00549.**
- ✓ **Look at use cases, messaging, and growth.**
- ✓ **Minimize power. State/status updates. Not intended to be wireless bus.**
- ✓ **Consider legacy compatibility implementation.**
- ✓ **Mature software interfaces and associations over the next**

Common Message Format



IPT Lead Paul Smith

- **Addition of any new messages between TESS/Component and radio have large cost and time impact to instrumentation systems.**

- **Require changes to proprietary Player Unit Radios, Base stations, and vendor specific IS gateway software.**

IPT Goal

- **Eliminate the need for instrumentation radio software updates due to introduction of new TESS/Components and training capabilities, while ensuring long term interoperability and supportability of our systems.**

- **Publish a solution that we can implement with minimal impact to industry's current product lines/activities. A solution providing flexibility to support future TESS and**

Common Message Format - Discussion



PM TRADE anticipates that it could be faced with a potentially significant expenditure of time and resources to perform software updates to instrumentation radios as new data types are introduced to the LT2 architecture to support future TESS and training capabilities (such as NLOS engagements, player to player communication, medical simulation, physiological monitoring, etc). To overcome this issue we want to make our instrumentation radio systems more agnostic to the messages sent between the TESS and CIS/EXCON.

Ongoing Program Activities

- The OneTESS program (PM LTS/GDC4S) is introducing new capabilities that are driving updates to current HITS program (PM CTIS/Saab) instrumentation;
- The CTC-IS program (PM CTIS/Northrop Grumman) is planning to field a new instrumentation radio to the NTC and JRTC over the next several years
- The yet to be awarded AMITS program (PM CTIS/TBD) will field radios to the remaining Homestations under the HITS program of record and potentially to other PM TRADE customers.

Radio Agnostic Concept



TESS Interface
PUR
Base Station
Radio (Low) Gateway(s)
Common TESS Gateway
New Gateway Passes thru existing msgs

Legacy
Ping, status, Ack, time, pos, etc.
IS_TESS
Event Report/Cmd, Unit config, Etc.
IS Specific Control
Legacy IS_TESS to CIS Messages (PUR aware)
PU_XML

High Side
Mux & CDS
PU_XML
PU Controller
TESS & Future TESS

New Addition
TESS Future
RADIO_AGNOSTIC IS Message with Priority/QoS
PU-XML DataPDU
TESS Future
RADIO_AGNOSTIC IS Message with PriorityQoS
PU-XML DataPDU

Add Generic Radio Agnostic message to existing IS TESS standard.

Input Needed for Legacy IS Systems



- Maximum Size of payload messages
  - Upstream from PUR (100 bytes?)
  - Downstream to PUR (200 bytes?)
- Data fields required by radio to transmit the agnostic message
  - Priority (Urgent, Normal, Low)
  - QoS (including Reliable/Best effort, Broadcast, Multicast, etc)
  - Compression/Encyrption. Is payload compressed or could be compressed.
  - Source/Dest?
- Other Impacts to existing radio systems?

Byte #	Hex	Field	Description
1	BB	Sync	Sync Byte
2	80	Message ID	Identifies IS Message type
3	XX	Size	Message Length (10 to 250) in bytes
4-5	XXXX	Event Number	Index indicating the # of the event (16-bit unsigned integer)
6	XX	Priority/QoS	IS Transport Priority & QoS Enumeration
7-8	XXXX	Sub-Payload Message ID	Unique ID from 1-65535 indicating the type of payload included in this message. Portion of 16-bits could be assigned for control bits (encrypt).
9-N	XX….XX	Payload	0 to x bytes of defined data defined by the unique Payload ID. (Limits: <100 bytes for PU->CIS, <200 bytes CIS<->PU?)
N+1-N+2	XXXX	Checksum	Addition of preceding N bytes.

Battery Interfaces, Power, and Configurations



IPT Lead Dave Brunat

IPT Goal: Establish a common rechargeable battery interface configuration for common use cases considering:

- ✓ **Rechargeable Battery Connector(s)** – Common connectors for all rechargeable battery configurations regardless of size or conformal form factor
- ✓ **System Management Bus (SMBus)** – Mature and document the interconnecting, managing and controlling of smart batteries/chargers
- ✓ **Voltage/Amperage** – Standardized voltage output and ranges; identify a family of amp hour rating batteries for different use cases
- ✓ **Physical Configurations** – Based on use cases, optimize a fixed size configuration(s) and address conformal battery configurations
- ✓ **Charger Interface Configuration** – A common configuration to accept vehicle power to ensure clean filtered power and interface logic for vehicle power status
- ✓ **Charger Form Factor / Cable Based Approach** – Minimize the charger configurations and/or adopt a connector based charger to enable the input to be common

Family of Consumable/Component Batteries



IPT Lead Dave Brunat

<u>Objective:</u> Reduce unique Inventory and related support costs

Currently various types, sizes, voltages, and configurations.   Objective is to establish a family of battery form factors for industry to choose from considering:

- ✓ Power, Sizes and Connector standardization (e.g., AA, ½ AA, coin type#1 with voltage x, coin type #2 with voltage y….).
- ✓ Technology Innovations vs. Form factor

IPT Goal

- **Identify family of consumable battery configurations (form factor) and voltages for future programs.**
- **Utilize government cost benefit analysis in determining best course of action.**



Process

PM TRADE Interface Standards Mgt. Process



Interface Stds. Mgt. IPT

✓ **PM LTS**
- APM - Brunat
- Chief Eng. - Campos

✓ **PM DT**
- DpM - Ravelo
- Chief Eng. - Nguyen

✓ **PM CTIS**
- DpM - Hinds
- Chief Eng. - Smith

✓ **APM TRADE**
- Ch. Eng. - Grosse (Chair)
- LT2 Arch - Lanman
- SRI - Wolf

✓ **TRADE** Eng.- Kemper

Individual Program Interface and Functional Requirements

<<<<< Program Teams: PDs, Engineers, Log — Program Rqmts

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<<<<< Program Teams: PDs, Engineers, Log — Program Rqmts

<<<<< Industry recommended changes via existing LT2 CAWG Process — Industry Input

PM TRADE CM Process – Standards



Industry & Government

Participates

And / Or

Submits Change Requests

Periodic Industry Working Sessions

LT2 Portal

Core Asset Working Group (CAWG)

Product Line Change Management

PM TRADE Approve Updates

Feedback

Proposed Updates

Changes

Releases

Proposed Updates

Approves Updates

Monthly Standards IPT

Government & Standards Team

WGs receive change requests & submits updates to IPT

Individual IPT Working Group

Individual IPT Working Group

Individual IPT Working Group …

Other Working Groups

Working Groups meet as needed to support change requests

Path Ahead



1. **Individual IPT Working Groups meet and develop a plan ahead between 22 April and 10 May** (3 week window).
   - ✓ Plan of Action –Best Path Forward
   - ✓ Key Events/ Decision Points/Information Needed
   - ✓ Meeting Schedule/Location
   - ✓ Industry Forum Summary Slides

2. **Next Industry Forum with Individual Out-Briefs – May 22?**
   - ✓ Individual IPT Summary
   - ✓ Azimuth Check before IPT detailed action
   - ✓ Establish follow-on forum meeting schedule based on need and progress



PM TRADE
Standards Update

- **LTEC** – *Jim Grosse*
- **Aviation** – *Jim Grosse*
- **Victory** *- Pat Sincebaugh*
- **A-TESS** – *Dave Brunat*

Industry Leadership Committed to Support PM TRADE Critical Standards Initiative



ExCon & Communications Networks

CTC-IS/AMITS to TESS
1) Wireless PAN
2) RS-232 (legacy)
3) High Speed Port

O/Cs

Force-On-Target

Targets

Force-On-Force

Between TESS Components
1)Wireless PAN Interface
2)Physical Wired Interface

Field TOC

CTC ExCon / Range Ops Ctr / Homestation

Detector/SAT Sensitivity Standards

OneSAT – Beam Profile Software Driven?

Battlefield Effects

Urban Operations

ExCon & Comms	Simulated Fire	Live Fire
ExCon, AAR, RF Comms, ABCS, & Network Data Management	Combined Arms Engagement Pairing BLUFOR & OPFOR	Instrumented Urban Operations, & Battlefield Effects
T-IS	PM LTS A-TESS	PM DT FASIT

Standards Management (CTIA, LT2, FASIT) - APM TRADE



Live Training Engagement Composition (LTEC)

Live Training Engagement Composition (LTEC)



Live Training Engagement Composition

- Provides a set of re-usable core capabilities for live force-on-force training
- Government owned software
- Open interfaces and standards
- Operating system and h/w platform agnostic
- Can be used for embedded, appended, and hybrid live training applications
- Enables dual use of organic assets
- Reduces time for MILES installation
- Reduces lifecycle costs (storage, maintenance, personnel, consumables)
- Supports Army preferred solution to 'Train Anytime, Anywhere'





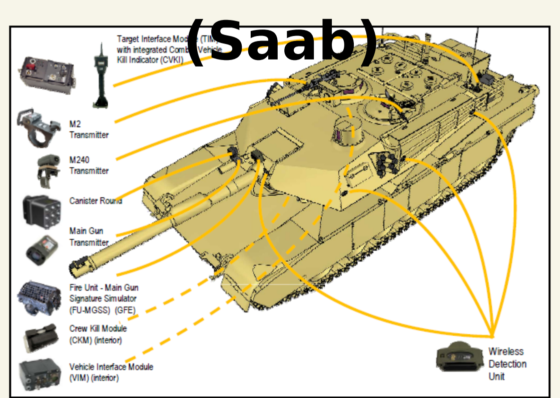
Current TESS Systems and Vendors

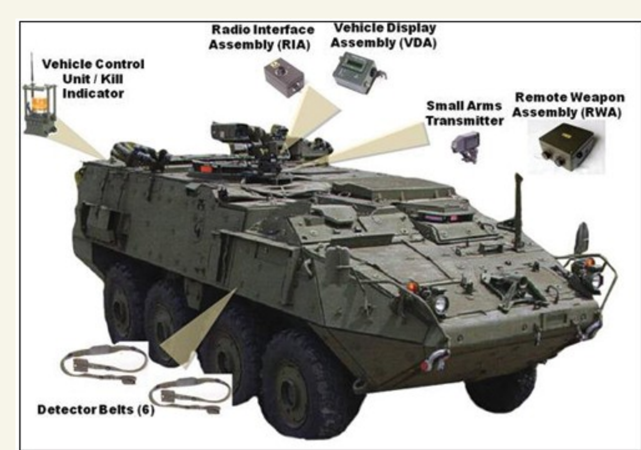


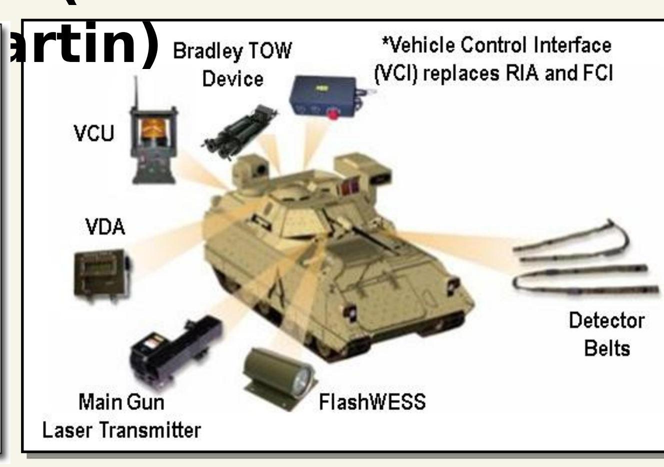
MILES XXI (Lockheed

artin)

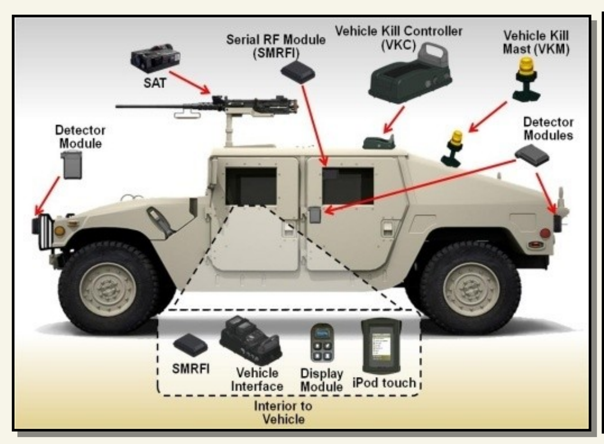
CV TESS (Saab)













MILES WITS

MILES TVS and MILES

Multiple MILES Systems Provided by Multiple Vendors

Current TESS Systems Approach



- System component interfaces are proprietary
- MILES software is proprietary
- Interoperate through laser (MCC Standard)

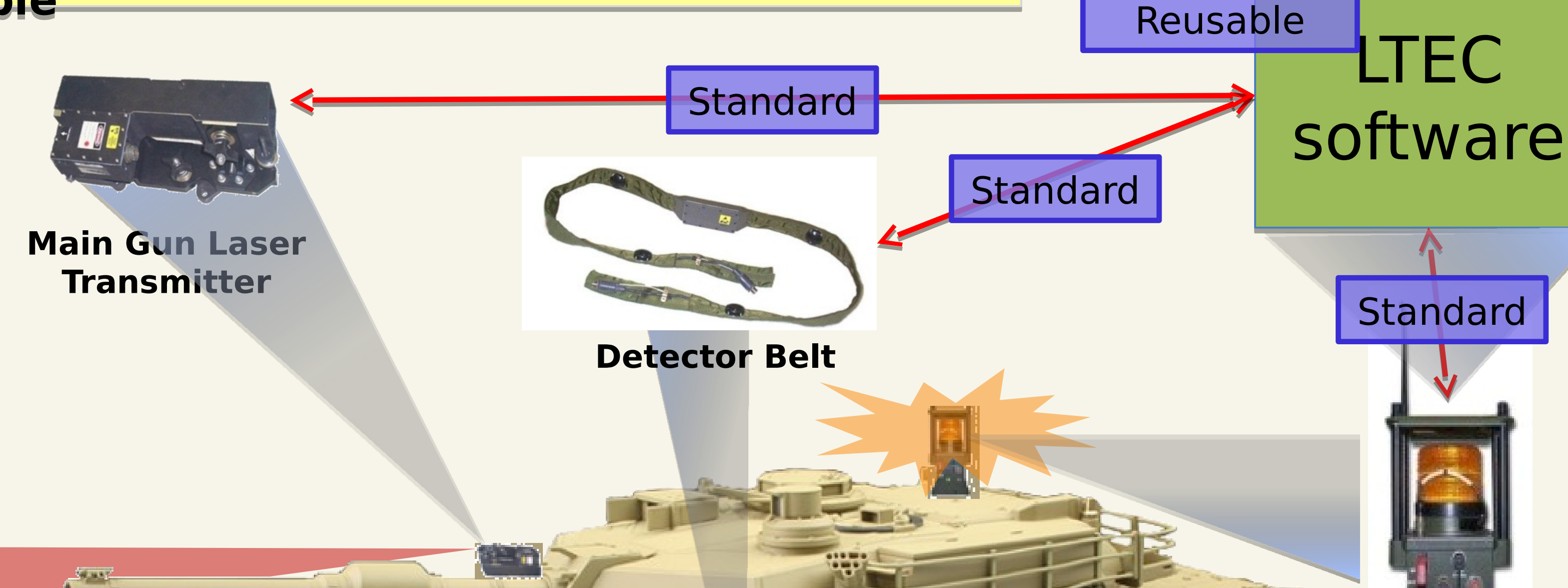


Systems Based Acquisition Approach

PM TRADE TESS Vision

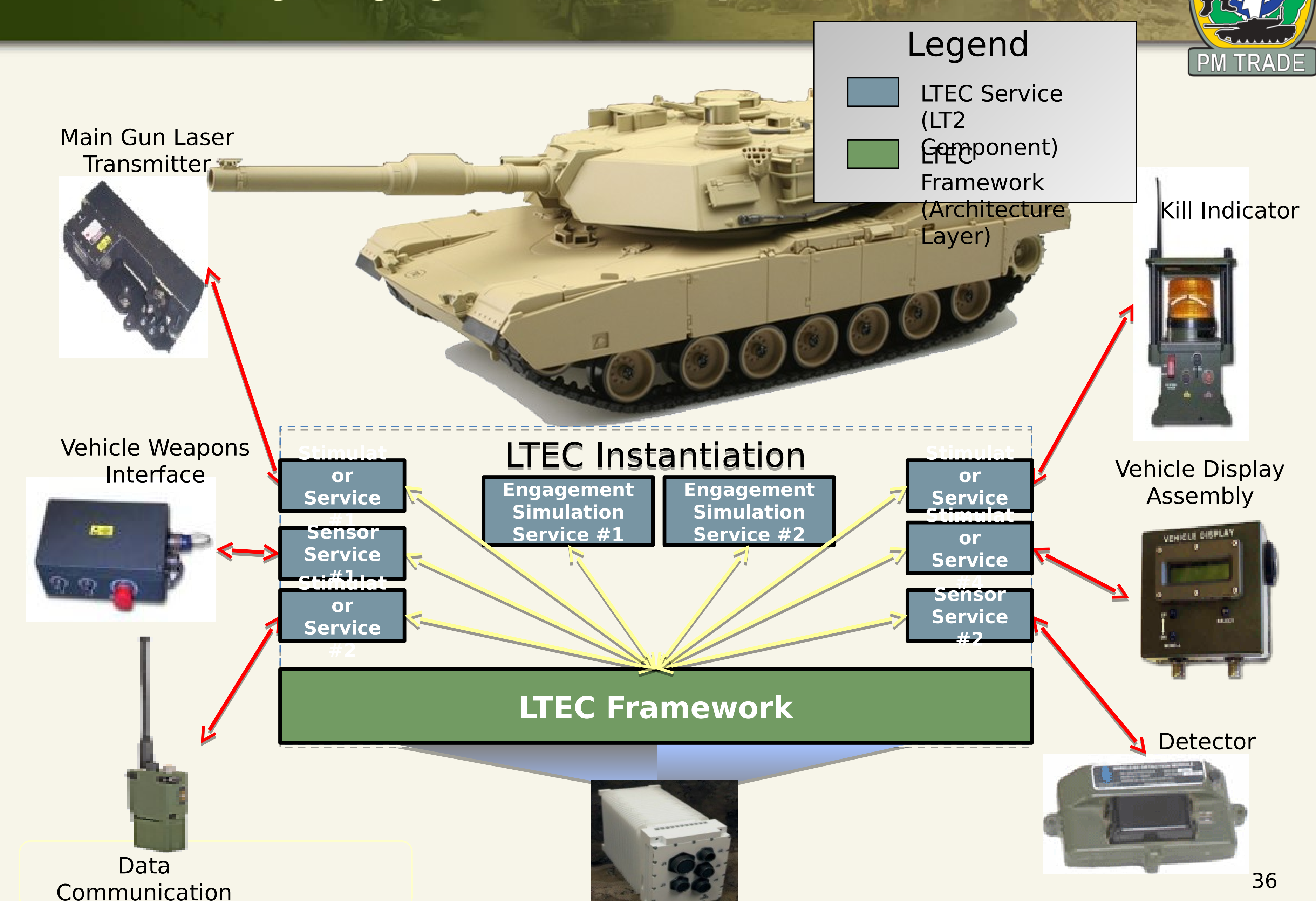


- System component interfaces are open standards
- System software is Government owned and reusable



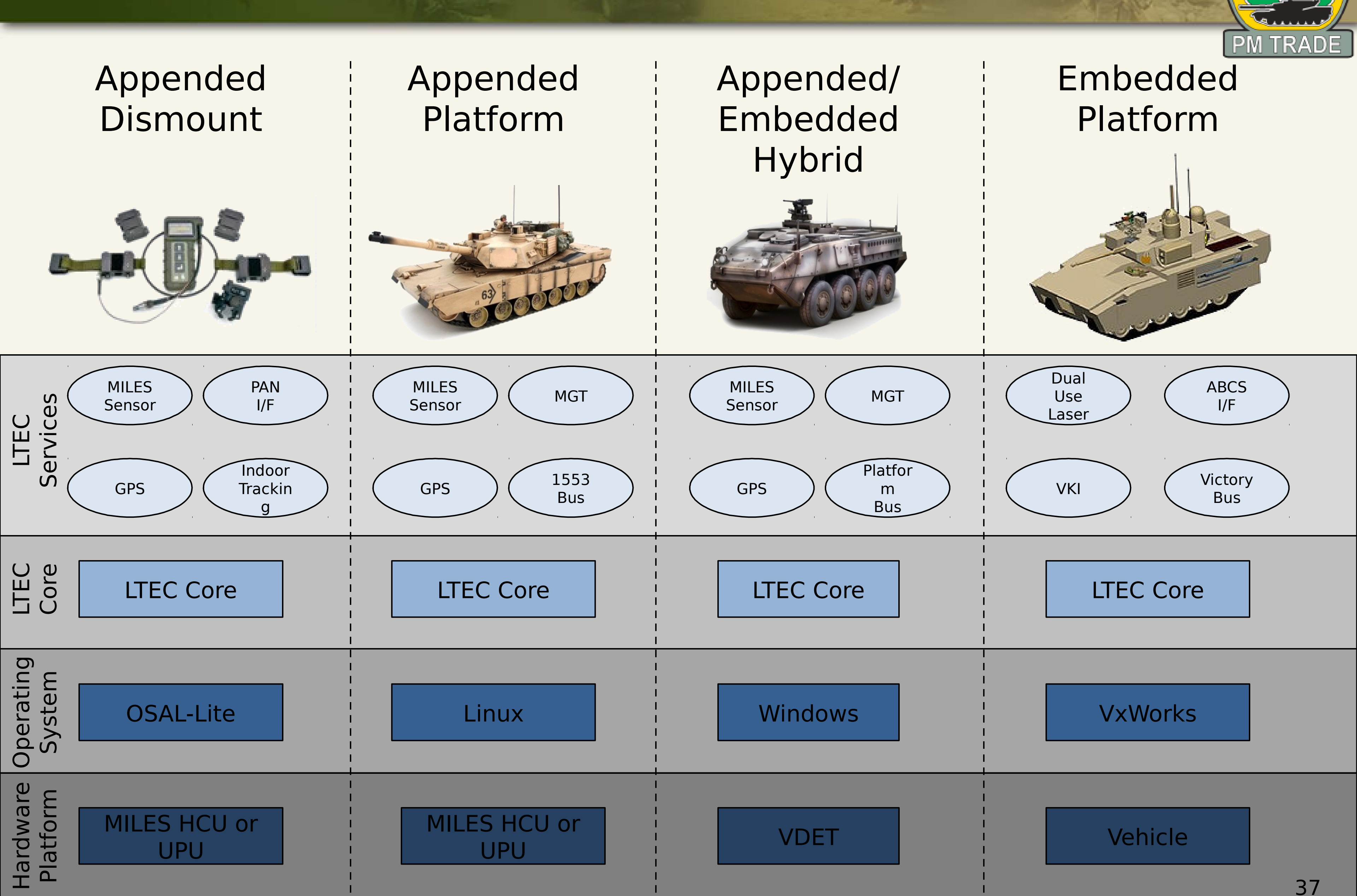
LTEC Enables Components Based Acquisition Approach

Live Training Engagement Composition (LTEC)



Live Training Engagement Composition (LTEC)

Example Compositions





Aviation Capabilities

Aviation Today



Existing UAS Command & Control Link

Universal Common Ground Station (UGCS) or Mobile Control Station

Existing Aviation TESS Network

TOWER SHELTER

RRU

PARROT

Existing Range Backhaul

IDT

HITS

ETC-IS

JRTC

NTC

JMTC

DRTS DAGIR

Aviation CTC Live Training

Long Term Vision

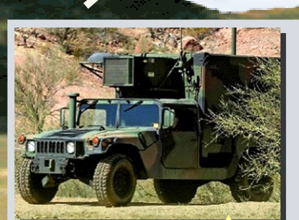




Existing UAS Command & Control Link

FACE / LTEC
Resident in legacy Inst. radios

Existing CTC or Homestation **Network**

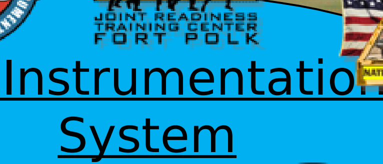


Universal Common Ground Station (UGCS) or Mobile Control Station

Open/Gov Owned Standard

Data Translator

Existing CTC or Homestation **Backhaul**







ETC-IS

JOINT READINESS TRAINING CENTER FORT POLK

HITS

JMRC

DRTS DAGIR

LT2 Instrumentation System CTIA

Challenge

- Army is supporting multiple RF networks

Solution

- Align with Future Aviation open architecture and embedded training initiatives.

ROI Opportunities



Current Method for Aviation Architecture A/C Modernization

A	NTC
B	JRTC
C	JMRC
D	ETC
E	HITS
F	DRTS/DAGIR
G	LBA TESS

Reduce Sustainment Costs

Common Gateway

Current Path for UAS
- Requires AVN specific Network

NTC
JRTC
JMRC
Korea
Germany
Ft. Hood
4 on call

Increase Training Capability

Aviation Architecture

NTC
JRTC
JMRC
Korea
Germany
Ft. Hood

15 additional HITS locations

Increase Integrated Air-Ground AAR Capability



Vehicular Integration for C4ISR/EW Interoperability (VICTORY)

Briefing to the Training Community

PM TRADE Industry Day

Live Training Interface Standards

2 April 2013



Meeting Objectives

- **Inform the Training Community**
  - What is VICTORY
  - Why should Training Community care
  - How to get involved



NOTE: Source of slides with VICTORY logo – VICTORY Standards Support Office VICTORY 101 Briefing 28 June 2012

VICTORY Background



- VICTORY – Vehicular Integration for C4ISR/EW Interoperability
- IPT established by ASA(ALT) SoSE
  - OBJECTIVE: Adopt/create, validate, and manage a single authoritative framework and standard for vehicular integration
- VICTORY is not a test or training architecture or specification – it is a framework for integrating electronics on Army ground vehicles
  - Architecture – defines common terminology, systems, components, interfaces
  - Standard specifications – technical specs for items identified in architecture
  - Open – non-proprietary data, configuration and control interfaces
- VICTORY Standards Support Office (VSSO) formed to execute initiative
  - Initially led by PEO C3T Futures Office, recently transitioned to PEO GCS
  - Support from ASA(ALT), PEO consortium, RDECOM, SwRI

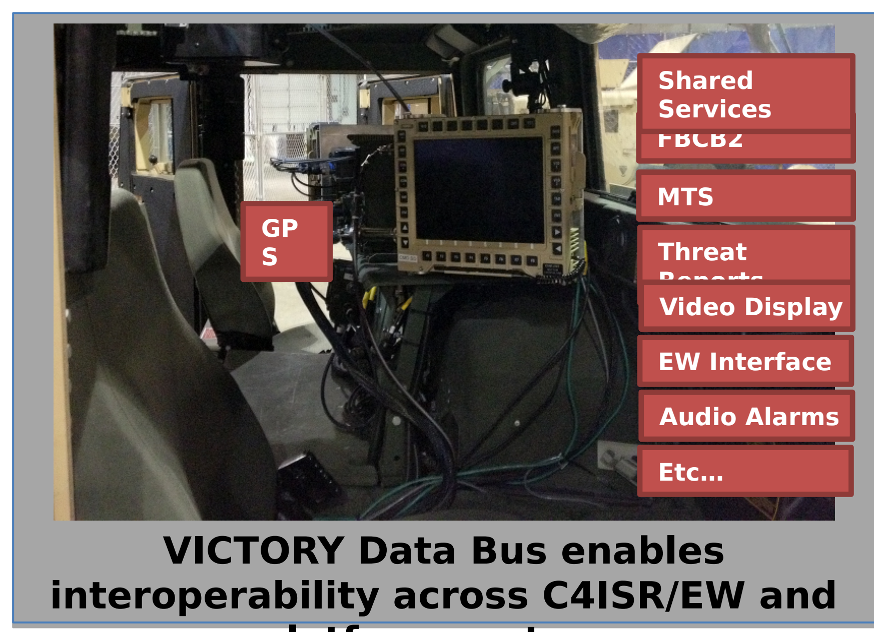
An Army SoS Problem: C4ISR/EW Integration in Ground Vehicles

Traditional Approach



"Bolt On" Mission Equipment Integration

Proposed Approach



VICTORY Data Bus enables interoperability across C4ISR/EW and platform systems

VICTORY Benefits

1) Reduces SWaP-C impact
2) Systems interoperate with each other via the VICTORY Data Bus (VDB)
3) Enables additional capabilities
4) Enabler for Commonality

VICTORY Architecture Composition



- VDB is composed of physical components, and services
- VDB has interfaces to C4ISR/EW and platform systems
- Following goes through these details

C4ISR/EW Systems
Situational Awareness & C2
Threat Detection & Reporting
Audio Communications
Video & Imagery SA
Mission Recording
Data Radios
EW Systems

VICTORY Data Bus (VDB)
Data Protection
Network Infrastructure
Shared HW Devices
Access Control Services
Shared Services
Management Services

Platform Systems
Automotive (Vetronics)
Power Distribution
Lethality (Weapons)
Protection
Logistics

VDB *Enables Integration* of C4ISR/EW Systems

VDB *Provides Interfaces* to Platform Systems

VICTORY Background



- Public website: www.victory-standards.org (limited information)
- VICTORY Sharepoint portal
  - https://sp.kc.us.army.mil/sites/VICTORY/default.aspx
  - Need CAC card or External Certification Authority (ECA) cert, and VSSO approval to access
    - Instructions on public site
  - Latest architecture and standards documents, briefings, meeting minutes, working areas for working groups
- Current Status
  - VICTORY Architecture A1 released 26 March 2012
  - VICTORY Specification 1.4 released 13 November 2012
  - Addressing Test and Training
    - Mission Recorder section – ***how*** data to support training is recorded
    - Embedded Training Interface section – will address ***what*** data is recorded for training (AI_CP_076 opened)

VICTORY Background



Test and Training requirements primarily addressed by AIWG

VICTORY Standards Support Office (VSSO)

Data Bus Working Group

- Develop standards for VDB
- Scope includes network composition/structure, data routing, QoS, interfaces in physical network layer, time synchronization for network

Application Interface Working Group

- Develop standards for VICTORY applications, e.g. common services such as position, orientation, heading, platform management
- If not related to DB or IA WGs then falls under AIWG domain

Information Assurance Working Group

- Develop standards aimed to protect information and data in VICTORY architecture

All working groups composed of government organizations, product vendors, vehicle and system integrators

VICTORY/Training IPT to be established to address test and training requirements in VICTORY architecture and specification

VICTORY Execution Strategy



STRYKER

Abrams and Bradley ECPs

CLOE

GCV

mFoCS and JBC-P

COE

Commonality

FACE

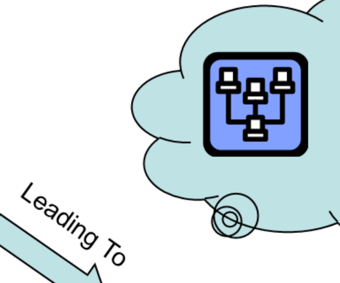
Others

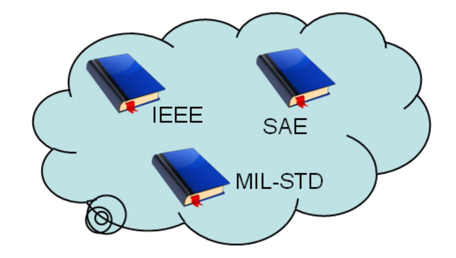
CONVERGING ON-GOING EFFORTS

VICTORY focuses on adopting/adapting/authoring, validating and managing a Single Authoritative Framework and Standards for vehicular integration

Develop Architecture

Baseline common components & standard interfaces to be applied to any tactical vehicle platform







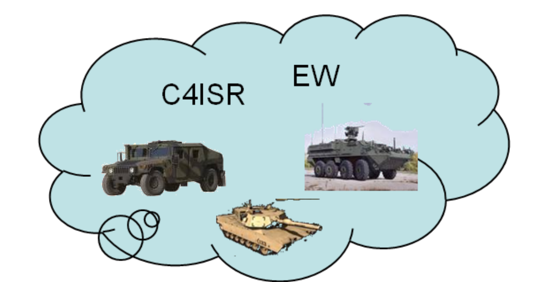
Adopt, Adapt and Creat Open Standards

Accepted for publication by recognized standards body

Available For

PEO/PM Implementation

Strategize acquisition path forward



VICTORY

Potential Use Case for Live Training Systems



Current Installation Process

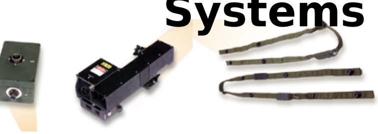


Live Training Systems Installation

- Long installation times
- Connection to multiple systems (audio, video, data bus…)
- Requires installation of adapters and/or running cables through hatches
- High rate of cable/connector damage
- Bradley has only fielded (limited) training port
- Lack of standardization

Potential Future Use Case

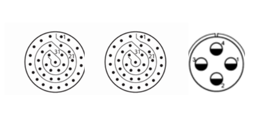
Live Training Systems





Multifunction Vehicle Port Interface Standard 29 August 2012

MFVP



Common Power & Data Interface for combat vehicles

VICTORY Specification

Training Data Available On VICTORY Data Bus

VICTORY Enabled Vehicles



VICTORY

Why Training Community Should Care



- Why should Training Community care about VICTORY?
  - VICTORY is gaining momentum
    - PEO GCS guidance for training – leverage VICTORY
    - VICTORY called out in recent acquisitions - GCV and Stryker RFP's
    - Bradley and Abrams ECP's call out VICTORY compliance
    - ~125 participants at December F2F meeting, 200+ members
    - Identified by Army Common Operating Environment (COE) as a critical enabler
  - Paradigm for VICTORY in-line with PM TRADE vision
    - Open standards

Time to influence VICTORY specification and architecture is now

VICTORY
How to Get Involved



- VICTORY Training IPT to be established by May 2013
  - Government and industry representatives
  - Develop Embedded Training Interface section of VICTORY specification
  - Modify Mission Recorder section of VICTORY spec as needed
  - Need to ensure live, virtual, constructive, gaming interfaces are identified
- Bi-weekly VICTORY Working Group telecons (AIWG, DBWG, IAWG) and quarterly face-to-face meetings
  - Recommend VICTORY 101 course at face-to-face meeting
  - Not training specific, see https://sp.kc.us.army.mil/sites/VICTORY/default.aspx for details
- If interested in supporting the VICTORY Training IPT contact:
  - Pat Sincebaugh
    PEO STRI PM TRADE
    407-384-5492
    patrick.sincebaugh@us.army.mil

VICTORY







Backup

VICTORY Products and Services

Products

- Architecture
  - Version A1 released Jan 17, 2012
- Standard Specifications
  - Version V1.1 released Jan 31, 2012
- Reference Designs
  - First release scheduled May 2012
- Initial Validation Artifacts
  - Published as completed
- Reference Software Library
  - First release, March 2012

Services

- Lead/Coordinate the VICTORY Standards Body
- Coordination and Outreach Activities with PMs
  - Cross-walking program performance specification with VICTORY specifications
  - Drafting VICTORY-related PWS language for PM RFPs
  - Synchronizing other on-going initiatives (e.g. COE, FACE, CBM)



What is VICTORY?

VICTORY *IS or DOES*

- Provide design guideline input
- Partnership
- Scalable leading to multiple price points for affordability
- Provide "build to" guidelines
- Seeking convergence
- A System of Systems Engineering (SoSE) initiative
- Provide input to platform and mission equipment PMs and Industry solicitations
- A framework providing an architecture, standard

VICTORY *is NOT*

- A vehicle design
- A PEO C3T initiative
- Cost prohibitive
- Hardware
- In conflict with other efforts
- A Program of Record
- Solicited through VICTORY RFP/BAA
- A runtime environment, middleware library, or software package

VICTORY Technical Approach

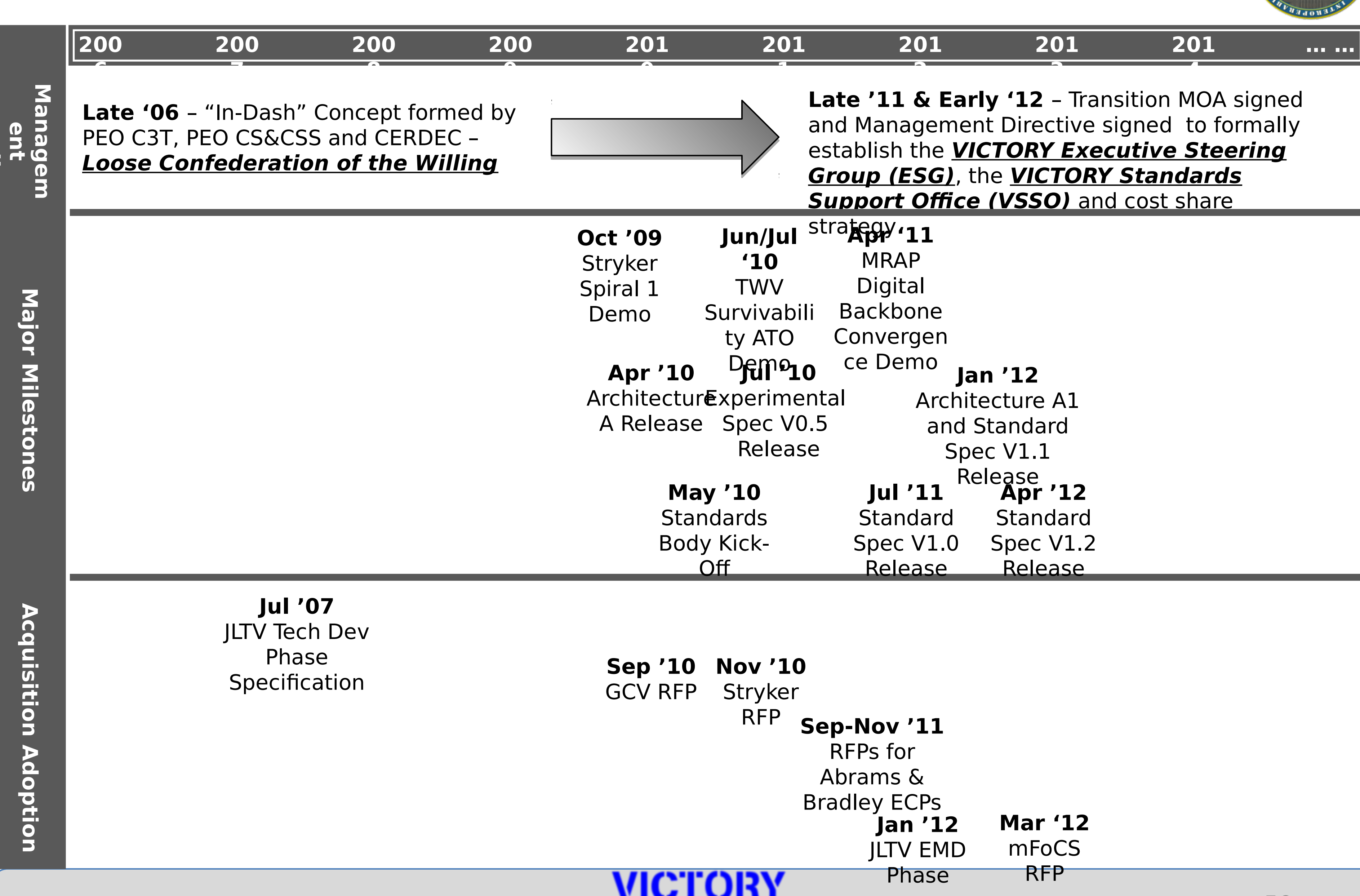
- Add a data bus (network) to vehicles
  - Integrate C4ISR/EW systems, interface with other electronic systems
  - Provide the plumbing for systems and components to interoperate (work together cooperatively)
- Provide shared hardware and services as part of the data bus
  - Shared processing and user interface hardware
  - Shared services
    - Management: configuration, control, health reporting
    - Position, orientation, direction of travel
- Define components with standard, open network-based messaging interfaces
  - IA components: protect data & control access
  - C4ISR/EW components: interoperate via network messages
  - Platform systems: interface with VDB via network

VICTORY Architecture Tenets

- Tenets; fundamental principles that form the core of the VICTORY architecture
- Electronics system designs on vehicle platforms should:
  - Utilize a “data bus-centric” design
  - Provide sharable hardware components, deploy software components without having to add hardware
  - Use only *open* standard physical and logical interfaces between systems and between C4ISR/EW components
  - Utilize a set of shared data bus services
  - Provide shared hardware and software IA components to enable system integrators to build security designs that protect and control access to information

Distribution Statement A: Approved for Public Release; Distribution Unlimited, 28 June 20

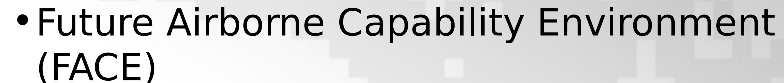
VICTORY Initiative History



VICTORY

Paradigm Supports PM TRADE Vision and Path Forward





- Future Airborne Capability Environment (FACE)
- Standard for aviation sys







Vision

For Embedded Training

12 June 2012

Version 37

- Software product line approach
- Software re-use
- Composibility
- Portable
- Modular
- Scalable
- Extendable
- Open standards

FACE

VICTORY

FACE & VICTORY are critical enablers for COE as part of the Real Time/Safety Critical/Embedded CE



- Vehicular Integration for C4ISR/EW Interoperability (VICTORY)
- Standard for ground vehicles
- Addresses Embedded Training
  - Mission Recorder (August 2012)
  - Embedded Training (Spring 2013)
- PEO STRI Initiatives
  - Multifunction Vehicle Port Standard
  - Live Training Engagement Composition

ATESS
Strategic Road Map

2 April 13

- **Problem Statement and Objective**
- **Task Identification**
- **Way Ahead**

Purpose & Objective

- <u>Problem Statement:</u>

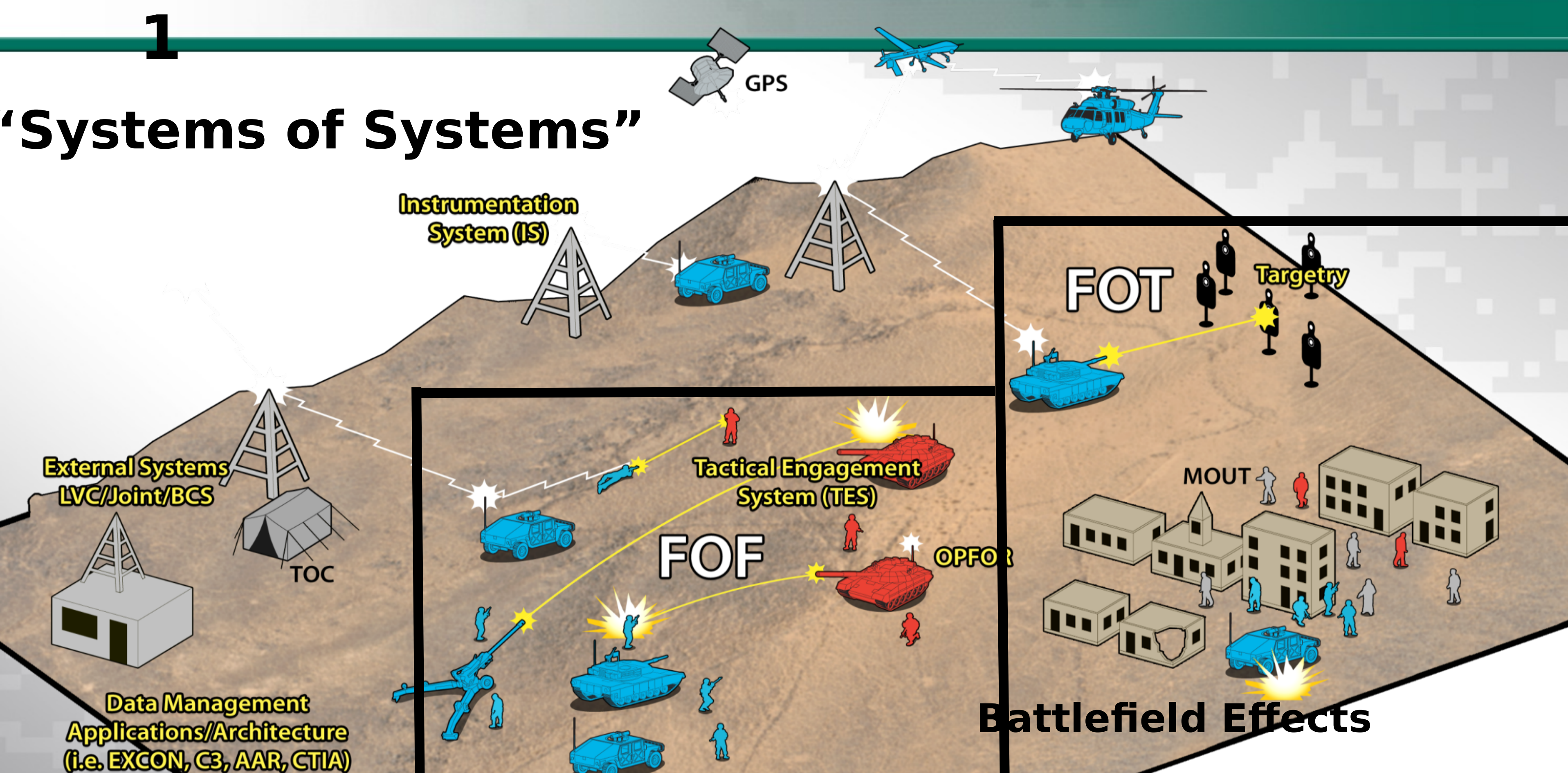
  The current suite of Tactical Engagement Simulations Systems (TESS) has some significant training gaps. Current TESS is not able to realistically portray indirect fire, casualty assessment, battle damage assessment, and many grenade launcher engagements. There is also no adequate solution to IEDs, mines, nonlethal weapons, chemical, radiological/nuclear and other capabilities. This reduces the commander's ability to realistically train and rehearse his combined arms unit in a live training environment.

- <u>Objective:</u>

  Acquire, field and sustain an increasingly realistic combined arms training capability for the live environment. The Army will use A-TESS to conduct live force on force (FoF) training for Brigade Combat Teams (BCTs), battalions, companies, platoons, squads, crews and individuals beginning in FY17. Units will use A-TESS to train on mission-essential tasks. A-TESS may be used by special operations units, fires units, mobility units, and sustainment units to train on operational tasks. A-TESS will support the execution of five principle-training environments. These are institutional, maneuver Combat Training Centers (CTCs), homestation (HS), deployed training sites, and Regional Training Centers (RTCs). As A-TESS matures, it will exponentially enable live FOF training anytime and anywhere. A-TESS will be an evolutionary, not a revolutionary, development in tactical engagement simulation systems (TESS). The Army will base A-TESS on components developed for those systems which are found in the Live Training Transformation Family of Training Systems (LT2-FTS) product line. A-TESS will

Live Training and Test Environment – OV-1

‘Systems of Systems”



T-IS	A-TESS	FASIT
ExCon, AAR, RF Comms. & Network Data Management	Combined Arms Engagement Pairing BLUFOR & OPFOR	Standards Management
PM DT & PM CTIS	PM LTS	APM TRADE

ATESS Force on Force

The Power of Instrumentation



Combat Vehicle Tactical Engagement Simulation System (CVTESS)

- Abrams/Bradleys
- Visual cues, battlefield effects
- Loader functions, soldier interactions

Individual Weapons System (IWS)

- Manworn dismounted system
- Improved comfort and weight



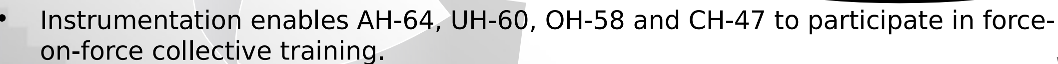
Shoulder Launched Munitions (SLM)

- Replicates AT4/RPG/BDM
- Visual cues, flash, and smoke to simulate a rocket firing

ATESS Interoperability

Program Synchronization
Common Components
Sustainment





- Instrumentation enables AH-64, UH-60, OH-58 and CH-47 to participate in force-on-force collective training.
- Provides information to enable IS to display aircraft location, weapons engagements, and status.
- Supports Aviation After Action Reviews (AARs)
- Provides visual indications of weapons firing and aircraft status.



Improvised Explosive Device Effects Simulator (IEDES)

- Kit consists of both pyro and non-pyro training devices
- Realistic detection/reaction training against IED threats through simulated, battlefield cues and effects
- Trains key tasks of Explosive Hazards (EHs) defeat, in support of full spectrum operations
- System works with MILES
- Scalable pyro and non-pyro signature effects

Indirect Fires

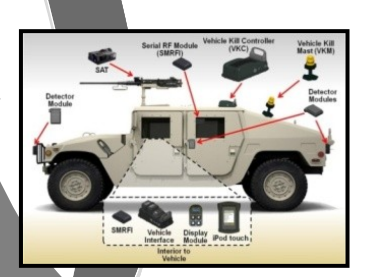


- Realistic tactical engagement simulation for NLOS weapon system
- Future development includes: Artillery, NBC, Aviation/Air Defense, EW/IOW, and Precision Gunnery



Universal Controller Device (UCD)/
Micro-controller Device (MCD)

- OCs, Testers, Training Cadre
- Transmit kill, near miss, reset and resurrect controller codes to the



Tactical Vehicle System (TVS, aka WITS)

- HMMWVs
- MRAPs
- Strykers
- Buildings
- Weapons link: Detectors to crew served weapons
- Reconfigurable (bunkers also)

ATESS Stakeholder Responsibilities

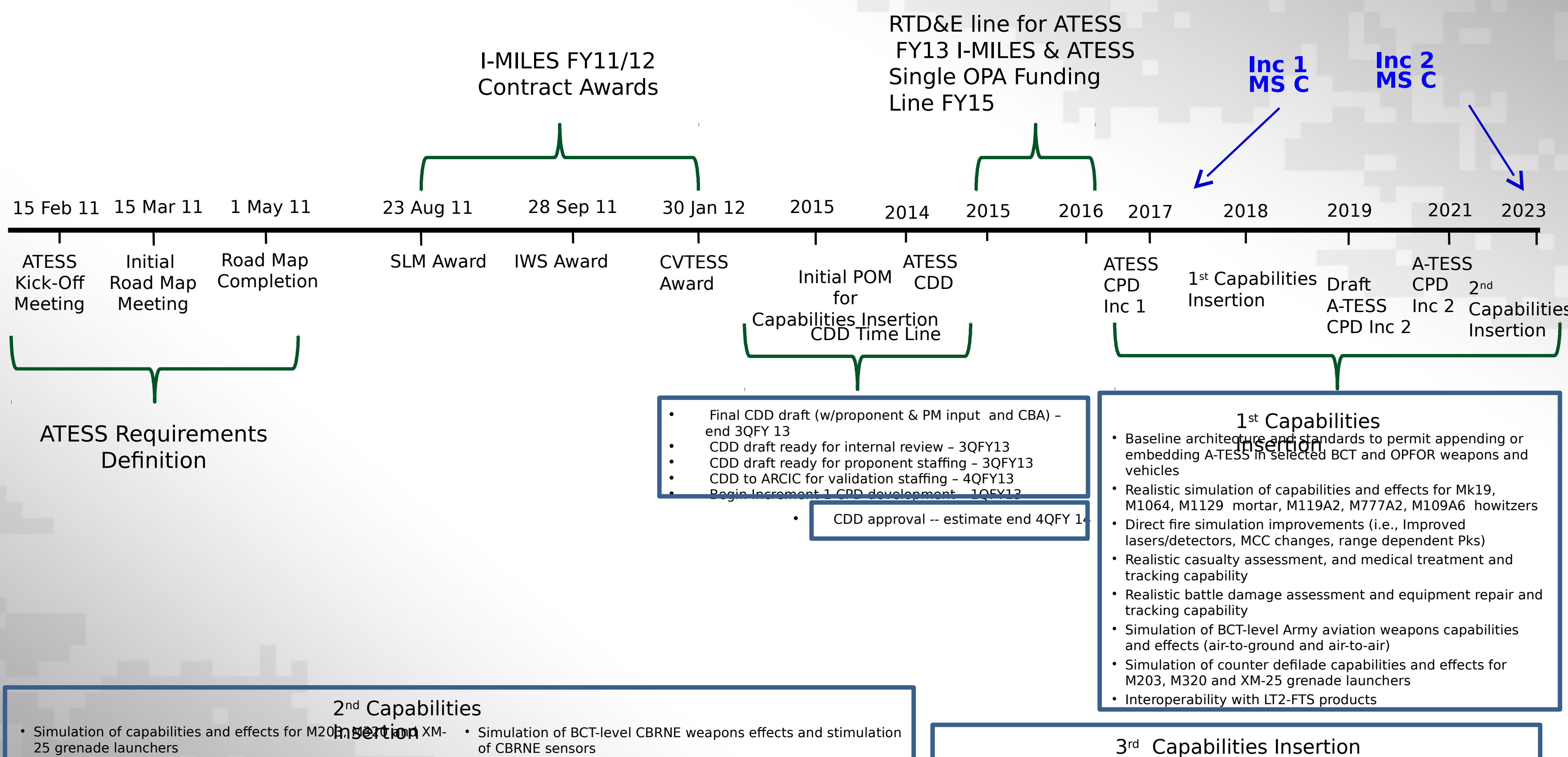
- TCM-L (Tim Hale/Danny Adkins)
  - Define Requirements
  - Identify Capabilities Gaps
  - Synchronize POM effort
  - Address Capabilities Insertion
  - BOIP Cross Leveling
  - Define BCT Sets
  - Develop CDD & CPD
  - Validate C/BA development

- PM LTS Engineering (Jesse Campos)
  - Integrating Architecture Development
  - Assess new State of the Art Lasers
  - Assess PK Table updates Impacts
  - GEO Pairing/Indirect Fire weapons
  - Assist with Development of CDD & CPD
  - Validate C/BA development

- PM Field Ops (Aaron Brown)
  - Assess Annual Sustainment Costs (WCLS)

- SRI (Rob Wolf)
  - Assist with Development of CDD & CPD

ATESS Road Map (High Level)



2nd Capabilities Insertion

- Simulation of capabilities and effects for M203, M320 and XM-25 grenade launchers
- Interoperability with LT2-FTS products
- Simulation of BCT-level air defense weapons and effects (ground to air) and aviation countermeasures (MAST)
- Simulation of BCT-level UAS weapons capabilities and effects
- Simulation of MLRS weapons and effects
- Simulation of IED weapons capabilities, effects and CM
- Unmanned Ground System
- Counter Batter
- Simulation of BCT-level CBRNE weapons effects and stimulation of CBRNE sensors
- Simulation of active protection systems (APS) and effects, Audio, visual and tactile cues for weapons effects
- Realistic simulation of weapons effects in all training environments (including MOUT) to permit visual adjustment of fires , stimulate Soldier response to fires, and the portrayal of collateral effects
- Simulation of Laser guided and precision guided munitions and laser designation capabilities
- Assessment of Improved Posture and Collateral effects (inside/outside equipment and buildings"

3rd Capabilities Insertion

- Simulation of Artillery Countermeasures
- Improved Audio/Visual/Haptic weapons effects: Simulation of weapons effects in all training environments (including MOUT) to permit visual adjustment of fires, tracer effects, HMD, stimulate Soldier response to fires, and the portrayal of collateral effects [Depending on whether we leave this as an Inc 3 capability.]
- Simulation of mine, stimulation of mine sensors, and portray mine clearing effects
- Simulation of BCT-level non-lethal and directed energy weapons capabilities and effects
- Assessment of naval gunfire/CAS weapons effects
- Simulation of weapons effects against Unmanned Ground Sensors
- Simulation of artillery countermeasures (to include Firefinder Weapon Location Systems)

A-TESS Concept Roadmap

- Requirements Documents:

- MILES 2000 ORD, Revision 1 approved Jul 96
- OneTESS ORD approved Dec 04
- OneTESS Increment 1 CPD approved Mar 09
- OneTESS Increment 1 CPD descoped requirements ADM Jan 1
- OneTESS MCS 3QFY14

- ATESS Final CDD 3QFY13

- ATESS Increment 1 CPD Development:

- Began 1Q FY13
- ATESS CPD Increment 1 MS C: 4QFY15

LT2 Portal

- ATESS and TIS requirements are resident on the LT2 portal

https://www.lt2portal.org/

Questions